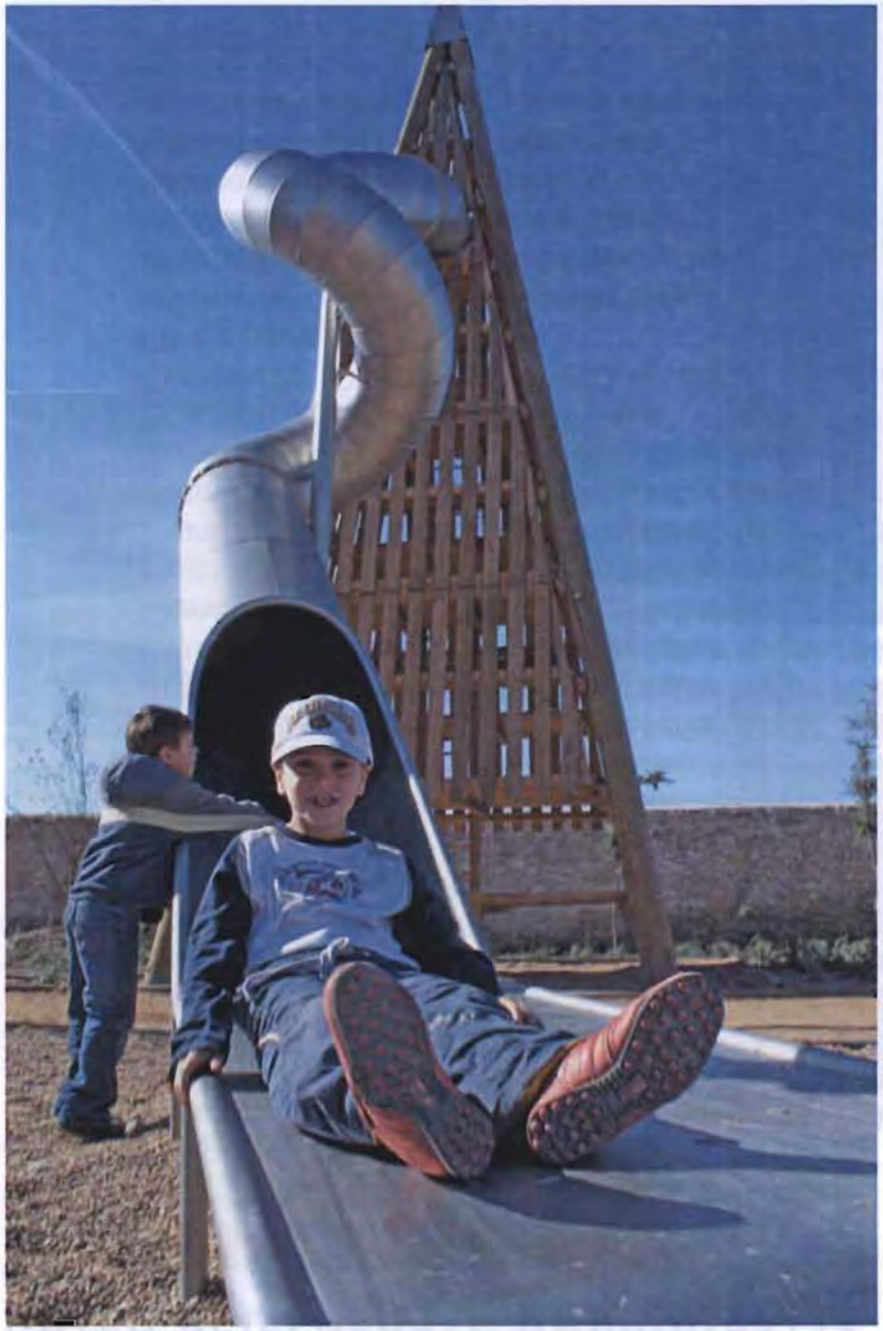
RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON +49-8052/17980·FAX 4180



Tunnel Slides
Open Slides
Combined Tunnel/Open Slides

Examples & information

Last updated: April 2009
valid for EN 1176/1177-2008

Contents

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON +49-8052/17980·FAX 4180

Planning

The examples of slides below are intended to provide initial orientation, especially if you do not yet know exactly what sort of slide you require for your building project.

Tunnel and open slides are not standard equipment. Instead we always plan the slides tailored to fit the respective project.

We differentiate Tunnel Slides (closed tubes, the run-out is always open), Open Slides and combinations of the two types. Furthermore, we make horizontal connection tunnels from tunnel elements.
All our slides are made of stainless steel; we do not offer GFK slides.

As a rule, the tunnel slides are fitted to play equipment (towers, platforms, pyramid towers) or buildings (e.g., escape slides). Open slides are either located on hillsides or are likewise fitted to play equipment/ buildings. In this case the standards stipulating fall height and impact absorbing surfaces are to be observed.

Tunnel slides can be used as escape slides depending on applicable regulations.

What details do we need?

To enable us to plan a slide for your building project we will need the following details and materials from you:

- building project information
- installation height
- Where is the slide to be attached (e.g., on a pyramid tower, platform, wall, slide support on a hill)?
- a site plan with directions of the compass, obstacles (e.g., trees) and where you would like the slide to start and finish
- a topographic cross section in the direction of the slide or a plan of the equipment to be attached
- your budget
- particular wishes/ requirements (e.g., snail run-out, portholes).

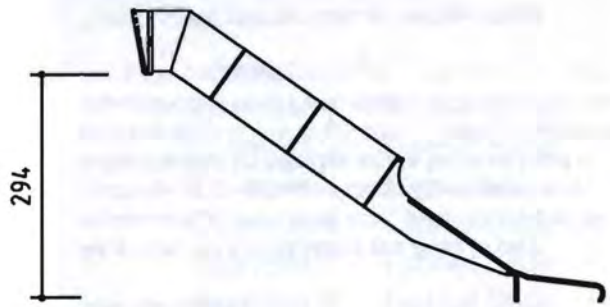
Upon receipt of an order

If you order the planned slide for your building project from us you will receive from us an approval document for production. You should then check the dimensions and send the clearance back to us signed and stamped. Then you will receive a foundation plan. The delivery period for the slide will be 4 - 6 weeks.
Depending on how it can be loaded for shipment the slide will arrive in one or several pieces (with connection flanges that can be bolted together).

Information of interest

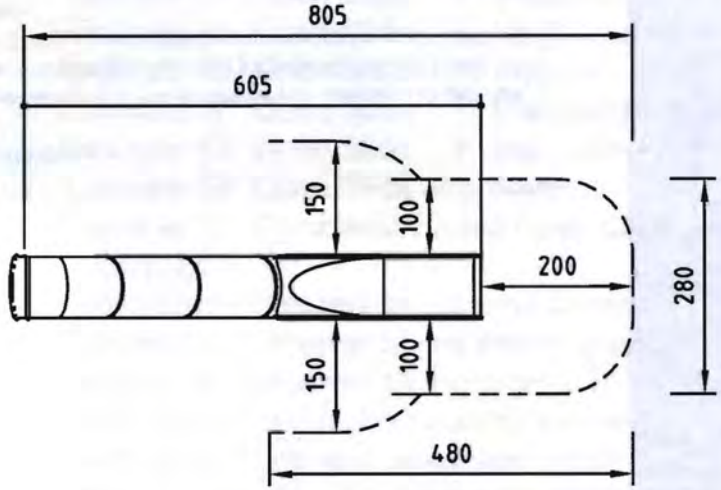
- The gradient of tunnel slides is, as a rule, 35 °; that of open slides 36 °. With high slides the angle can be reduced piece by piece to up to 30° to avoid high sliding speeds. This results in a rule-of-thumb:
  sliding length = installation height x 2
  horizontal length = installation height x 1.4
- With open slides that are to be fitted on a hillside it is necessary that the gradient of the hill is approximately the same as the sliding gradient (fall height). If this deviates too considerably the hill needs to be adapted for the slide – not vice versa.
- Also open slides with larger sides are only permissible up to a free fall height of 2.50m (surfacing material such as sand). Above this height tunnel slides are obligatory.
- The material thickness of the slides is 2.5mm.
- It should be always avoided that the slide is aligned in a southeast to southwest direction due to the heating of materials. If this is not possible then the slide should be provided with shade. This is only required for the run-out area with tunnel slides (cooling from the chimney effect).
- The number and length of supports depends on the course of the slide and the topographic situation.
- The directions of the curves (right curve, left curve) are from point of view of the direction of sliding.

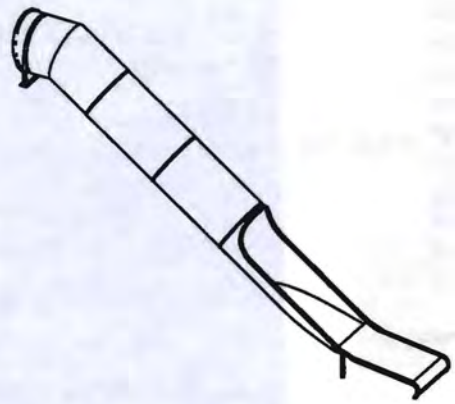
Information for customers and planners



Information on this slide

- installation height 294 cm
- sliding gradient 35 °
- sliding length 693 cm
- one-piece construction
- weight 295 kg
- suitable for attachment to pyramid towers (order No. 3.41000ff.)
- standard run-out
- 2 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm

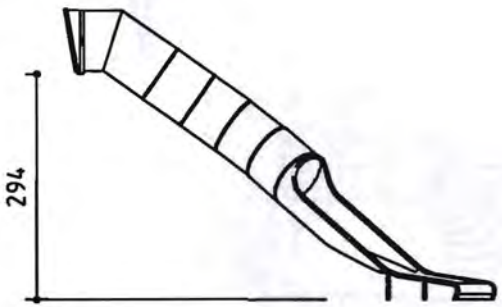




Legend for illustration
safety distance →
dimensions —●
scale 1:100 (format A4)

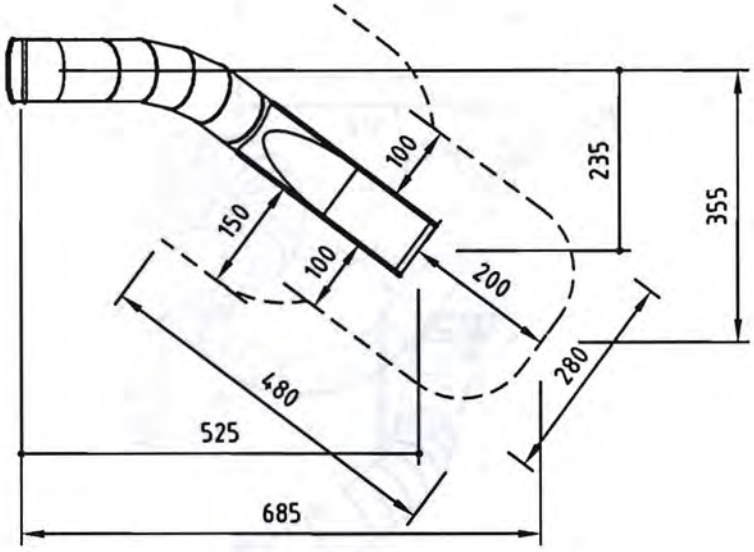
Tunnel Slide • Installation height 294 cm • Straight

Example 1



Information on this slide

- installation height 294 cm
- sliding gradient 35 °
- sliding length 685 cm
- 36 ° right curve
- one-piece construction
- weight 295 kg
- suitable for attachment to pyramid towers (order No. 3.41000ff.)
- standard run-out
- 2 foundations for the run-out **50 x 100 x 40 cm** excavation depth 80 cm

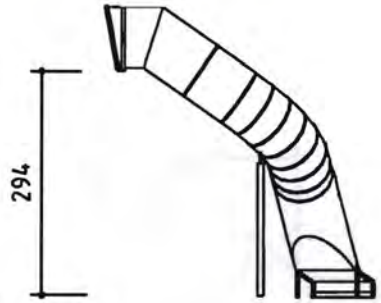


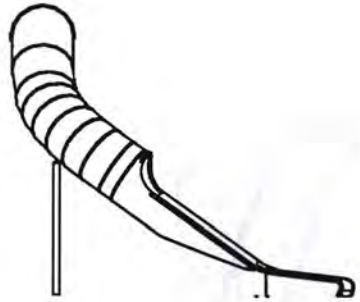
Legend for illustration
safety distance →
dimensions —●
scale 1:100 (format A4)

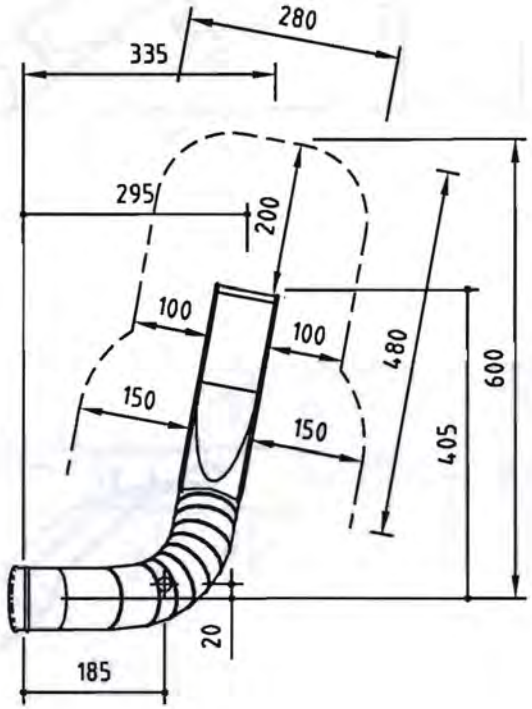
Tunnel Slide • Installation height 294 cm • Right curve

Example 2

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180





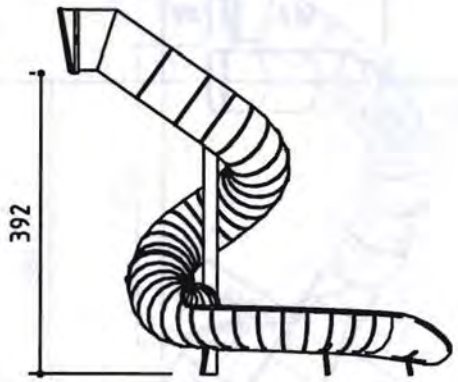


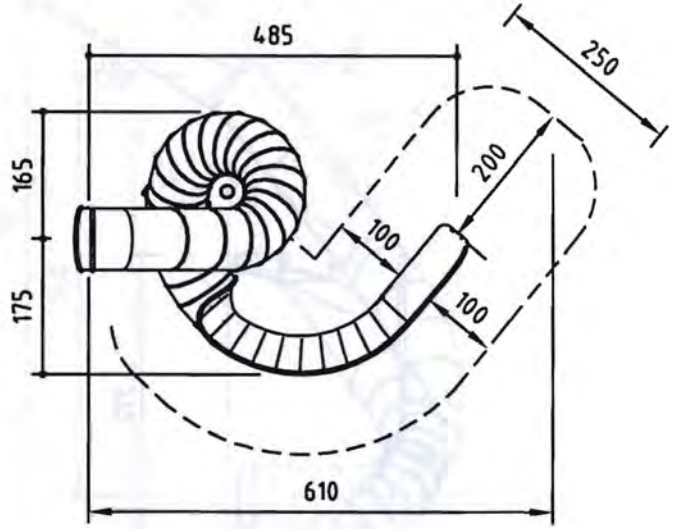
Information on this slide

- installation height 294 cm
- sliding gradient 35 °
- sliding length 688 cm
- 79 ° left curve
- one-piece construction
- 1 support
- weight 305 kg
- suitable for attachment to pyramid towers (order No. 3.41000ff.)
- standard run-out
- 2 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 1 foundation for support 80 x 80 x 40 cm excavation depth 80 cm

Legend for illustration
safety distance →
dimensions ●—
scale 1:100 (format A4)

Tunnel Slide • Installation height 294 cm • Left curve **Example 3**





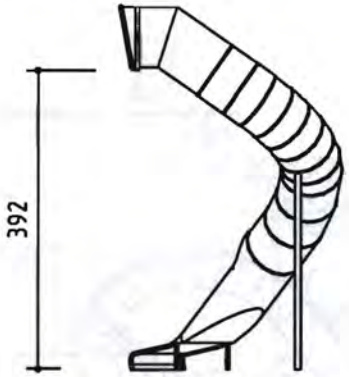
Information on this slide

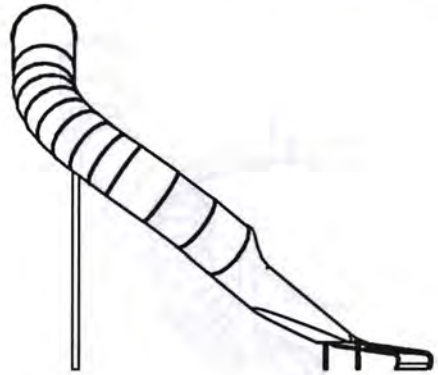
- installation height 392 cm
- sliding gradient 35 °
- sliding length 1123 cm
- **254 ° left curve**
- three-piece construction
- 1 support
- weight 530 kg
- suitable for attachment to middle and big pyramid towers (order No. 3.42000f.)
- snail run-out
- 3 foundations for the run-out **60 x 60 x 40 cm** excavation depth 80 cm
- 1 foundation for support **80 x 80 x 40 cm** excavation depth 80 cm

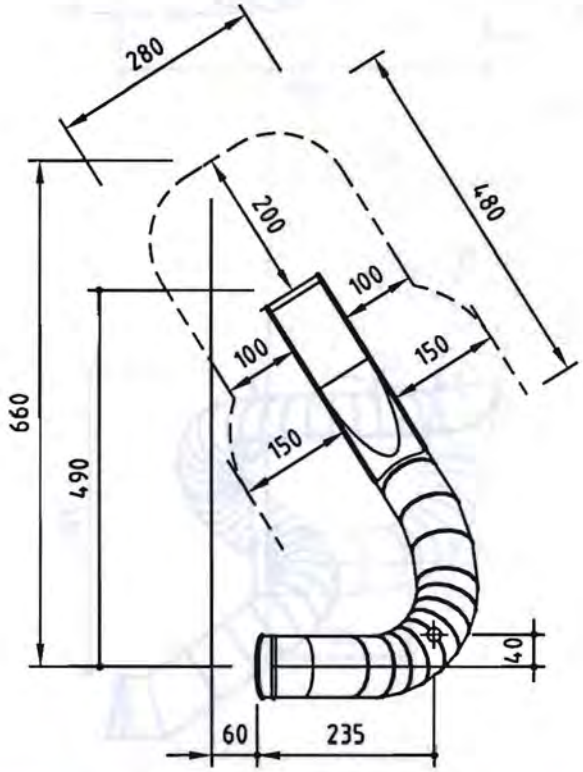
Legend for illustration
safety distance →
dimensions —●
scale 1:100 (format A4)

Tunnel Slide • Installation height 392 cm • Left spiral

Example 4







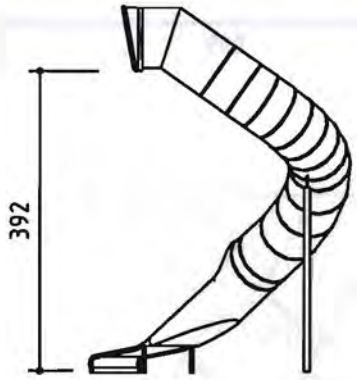
Information on this slide

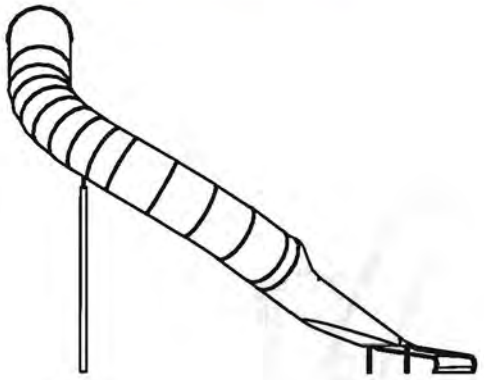
- installation height 392 cm
- sliding gradient 35 °
- sliding length 856 cm
- 121.5 ° left curve
- two-piece construction
- 1 support
- weight 395 kg
- suitable for attachment to middle and big pyramid towers (order No. 3.42000f.)
- 2 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 1 foundation for support 80 x 80 x 40 cm excavation depth 80 cm

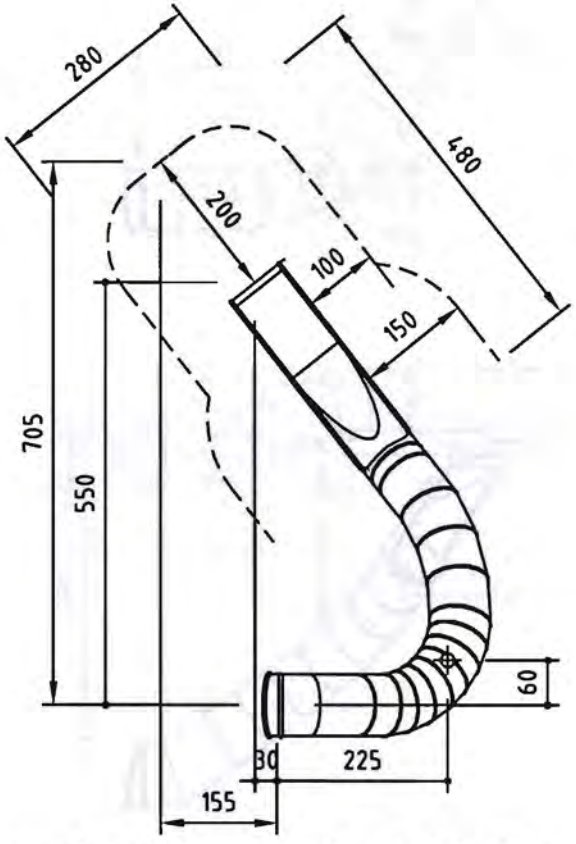
Legend for illustration
safety distance →
dimensions —●
scale 1:100 (format A4)

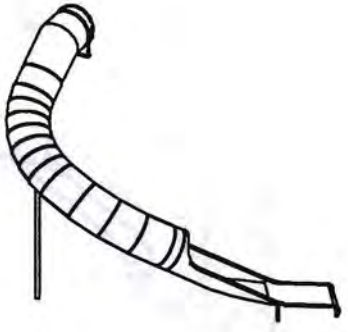
Tunnel Slide • Installation height 392 cm • Left curve

Example 5









Information on this slide

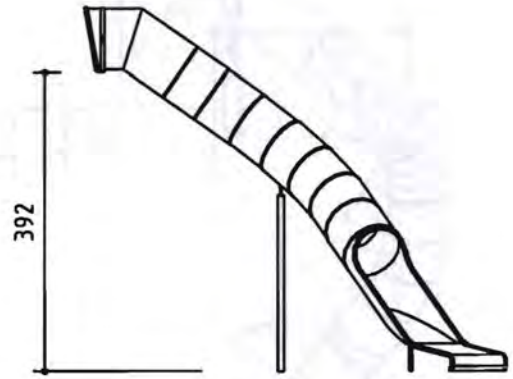
- installation height 392 cm
- sliding gradient 35-30 °
- sliding length 1036 cm
- 127.8 ° left curve
- two-piece construction
- 1 support
- weight 445 kg
- suitable for attachment to middle and big pyramid towers (order No. 3.42000f.)
- standard run-out
- 3 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 1 foundation for support 80 x 80 x 40 cm excavation depth 80 cm

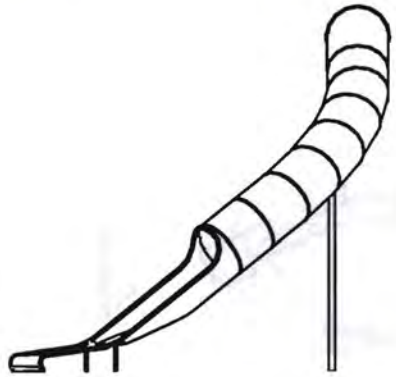
Legend for illustration
safety distance →
dimensions —●
scale 1:100 (format A4)

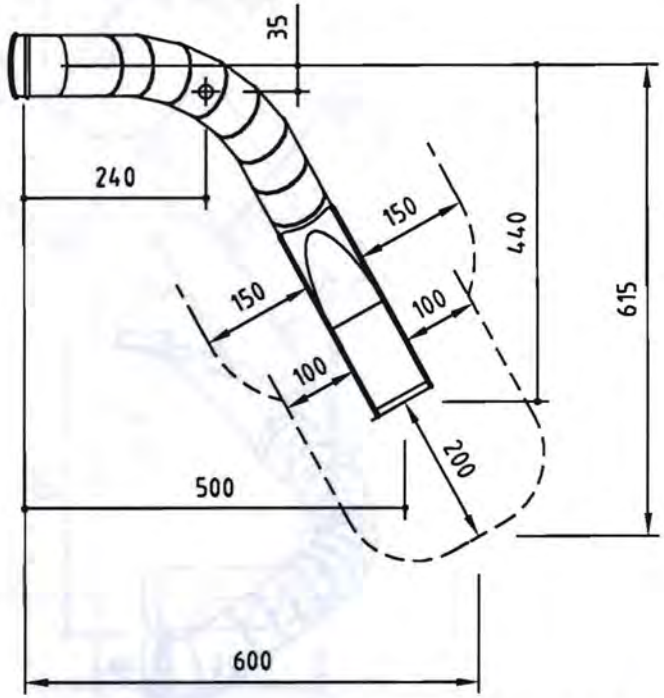
Tunnel Slide • Installation height 392 cm • Left curve

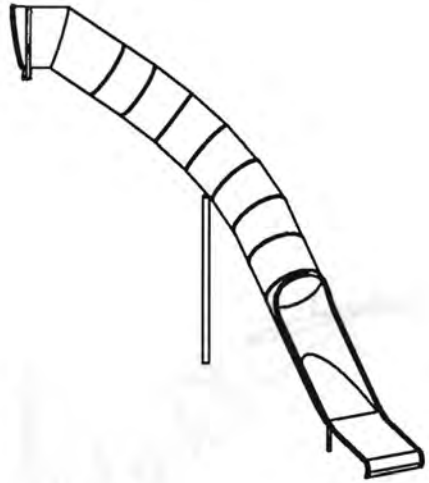
Example 6

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180









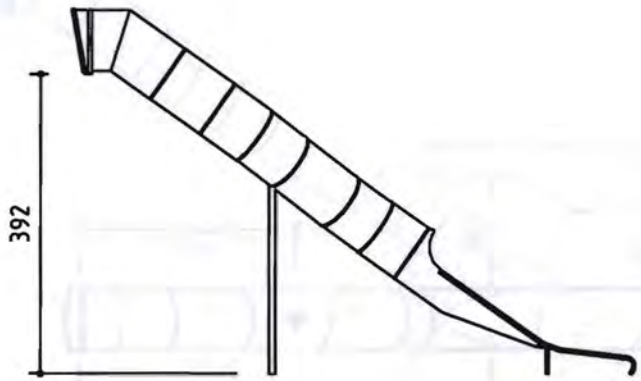
Information on this slide

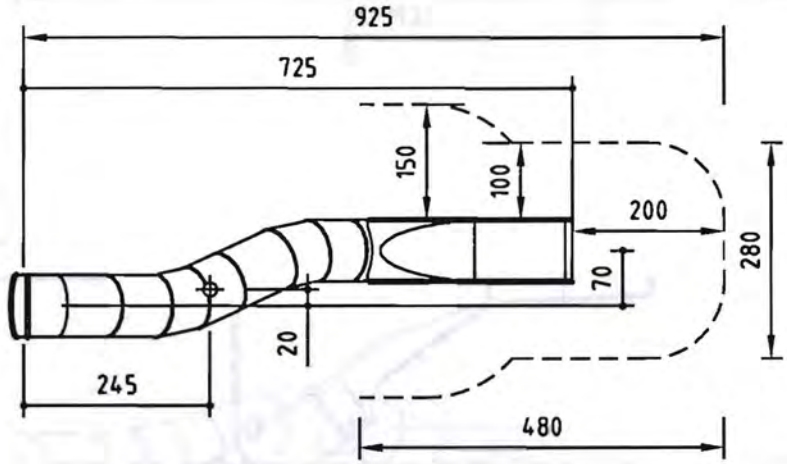
- installation height 392 cm
- sliding gradient 35 °
- sliding length 855 cm
- 60.7 ° right curve
- one-piece construction
- 1 support
- weight 380 kg
- suitable for attachment to middle and big pyramid towers (order No. 3.42000f.)
- standard run-out
- 2 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 1 foundation for support 80 x 80 x 40 cm excavation depth 80 cm

Legend for illustration
safety distance →
dimensions —●
scale 1:100 (format A4)

Tunnel Slide • Installation height 392 cm • Right curve

Example 7





Information on this slide

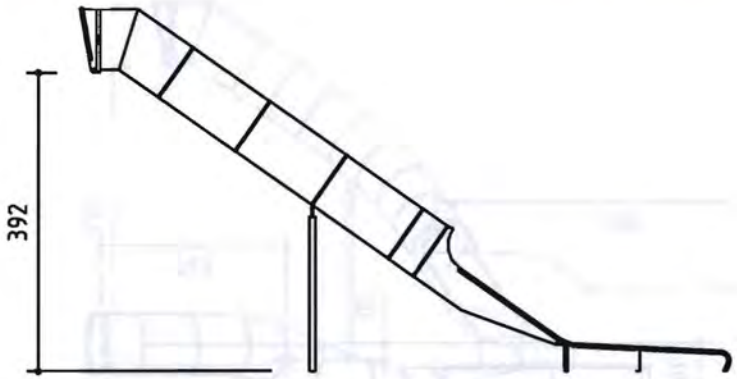
- installation height 392 cm
- sliding gradient 35 °
- sliding length 855 cm
- **24.3 ° right curve**
- **24.3 ° left curve**
- one-piece construction
- 1 support
- weight 380 kg
- suitable for attachment to middle and big pyramid towers (order No. 3.42000f.)
- standard run-out
- 2 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 1 foundation for support 80 x 80 x 40 cm excavation depth 80 cm

Legend for illustration
safety distance →
dimensions —●
scale 1:100 (format A4)

Tunnel Slide • Installation height 392 cm • Left-right curve

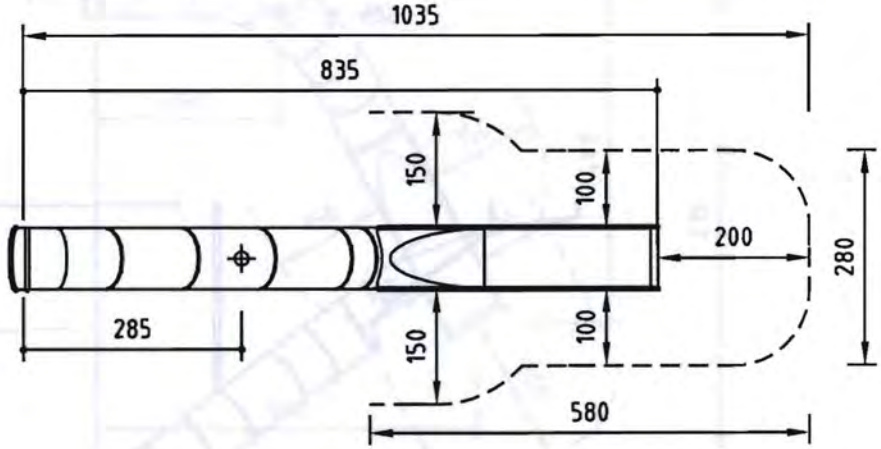
Example 8

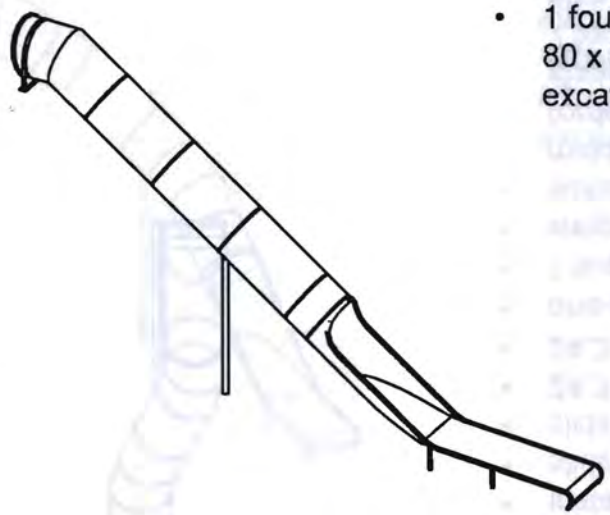
RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180



Information on this slide

- installation height 392 cm
- sliding gradient 35 °
- sliding length 957 cm
- one-piece construction
- 1 support
- weight 395 kg
- suitable for attachment to middle and big pyramid towers (order No. 3.42000f.)
- extended run-out
- 3 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 1 foundation for support 80 x 80 x 40 cm excavation depth 80 cm





Legend for illustration

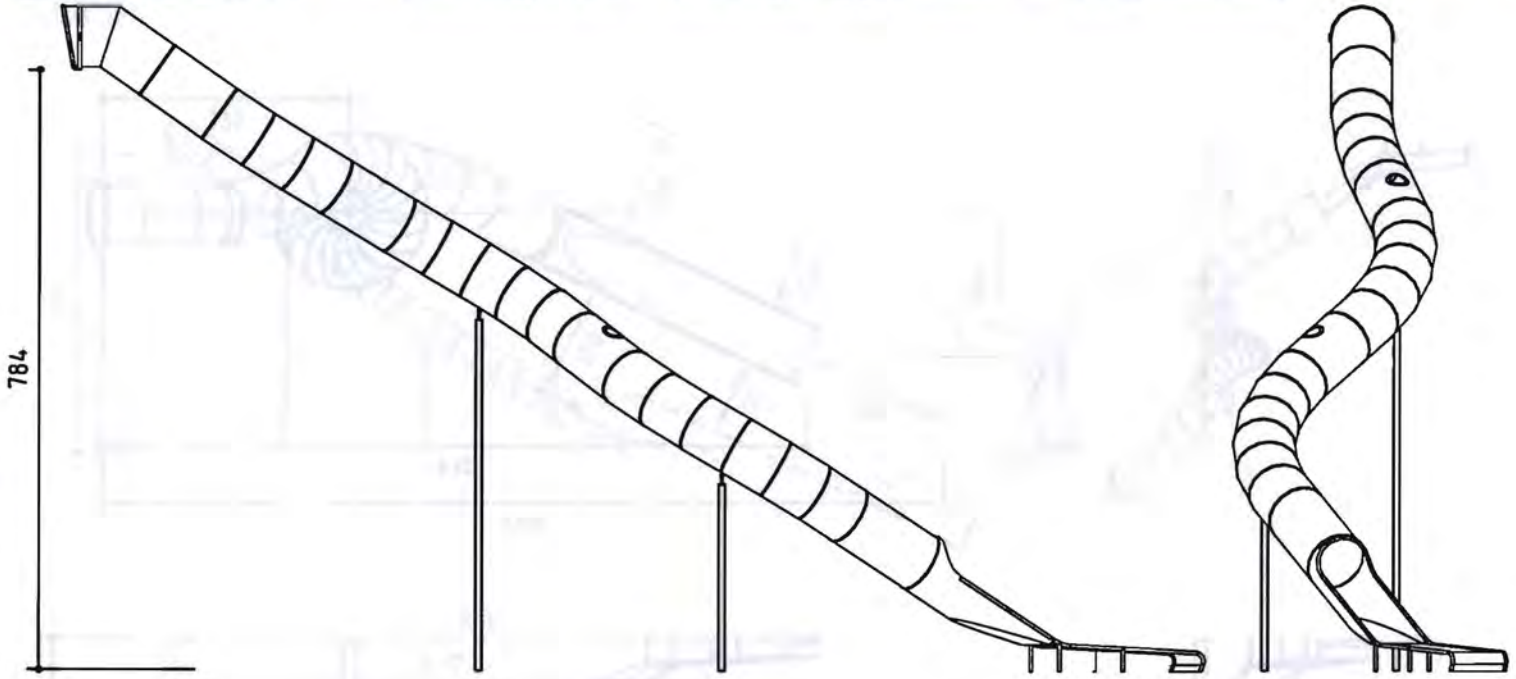
safety distance ——→

dimensions ——●

scale 1:100 (format A4)

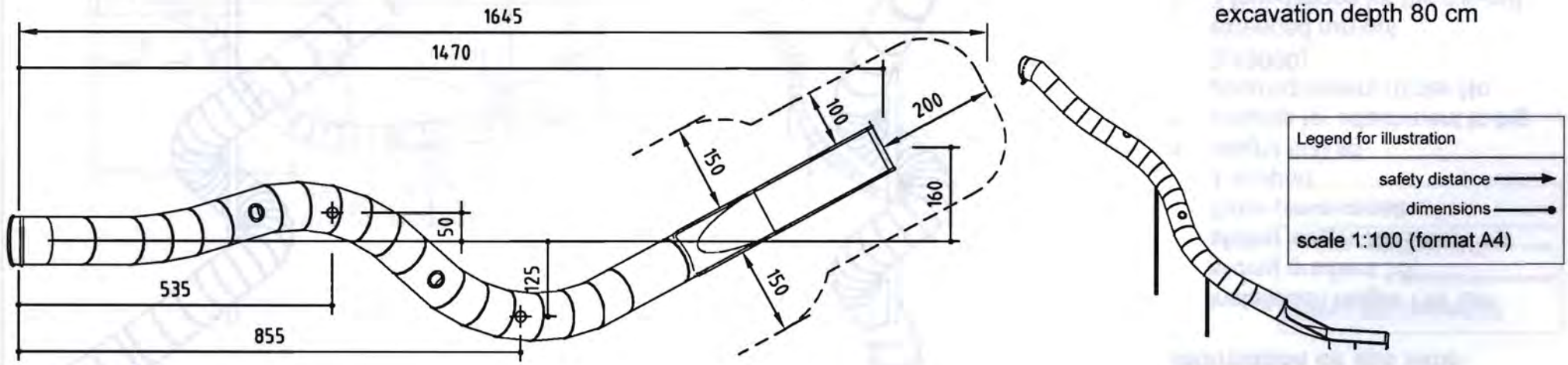
Tunnel Slide • Installation height 392 cm • Straight

Example 9



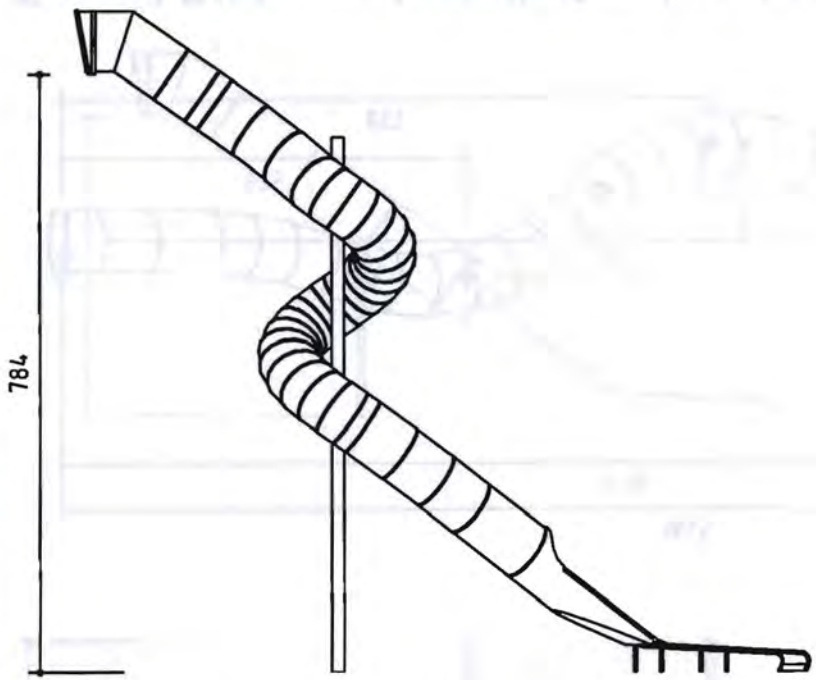
Information on this slide

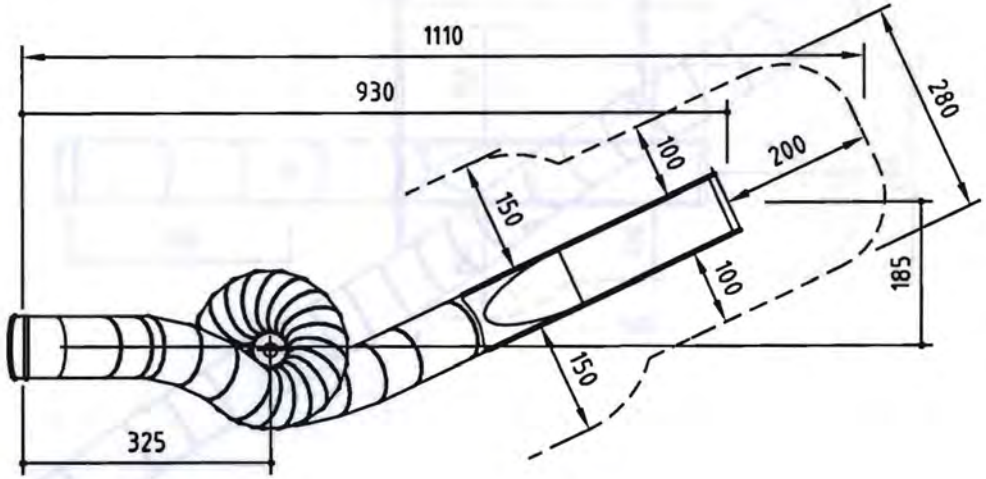
- installation height 784 cm
- with 2 portholes
- sliding gradient 35-30 °
- sliding length 1812 cm
- two-piece construction
- 2 supports
- weight 825 kg
- suitable for attachment to big pyramid towers (order No. 3.43000)
- extended run-out
- 3 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 2 foundations for supports 80 x 80 x 40 cm excavation depth 80 cm



Tunnel Slide • Installation height 784 cm • Left-right-left curve **Example 10**

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180





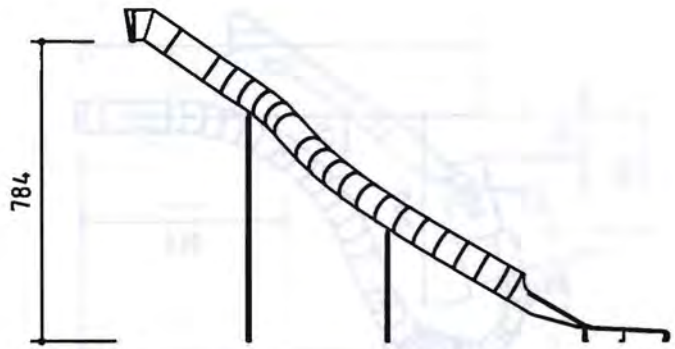
Information on this slide

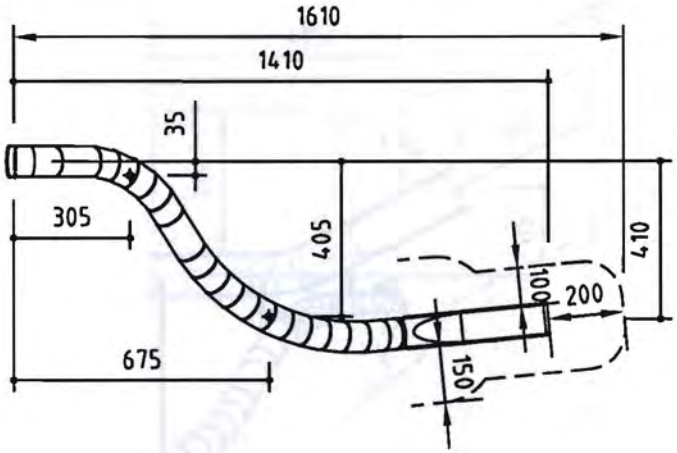
- installation height 784 cm
- sliding gradient 35 °
- sliding length 1648 cm
- three-piece construction
- 1 support
- weight 800 kg
- suitable for attachment to big pyramid towers (order No. 3.43000)
- extended run-out
- 3 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 1 foundation for support 80 x 80 x 40 cm excavation depth 80 cm

Legend for illustration
safety distance →
dimensions —●
scale 1:100 (format A4)

Tunnel Slide • Installation height 784 cm • left spiral

Example 11





Information on this slide

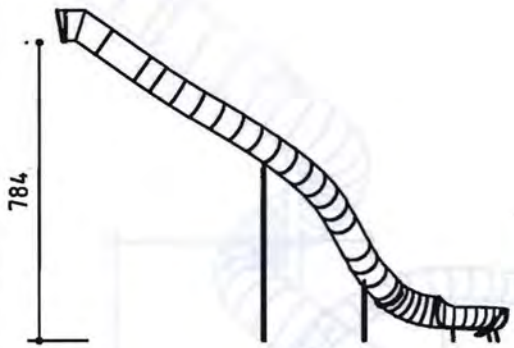
- installation height 784 cm
- sliding gradient 35 °
- sliding length 1804 cm
- two-piece construction
- 2 supports
- weight 815 kg
- suitable for attachment to big pyramid towers (order No. 3.43000)
- extended run-out
- 3 foundations for the run-out
  50 x 100 x 40 cm
  excavation depth 80 cm
- 2 foundations for supports
  80 x 80 x 40 cm
  excavation depth 80 cm

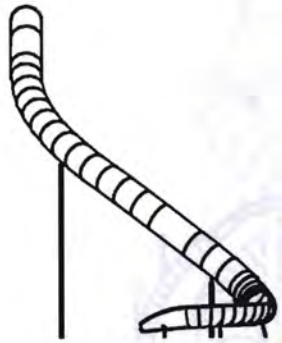
Legend for illustration
safety distance →
dimensions —●
scale 1:200 (format A4)

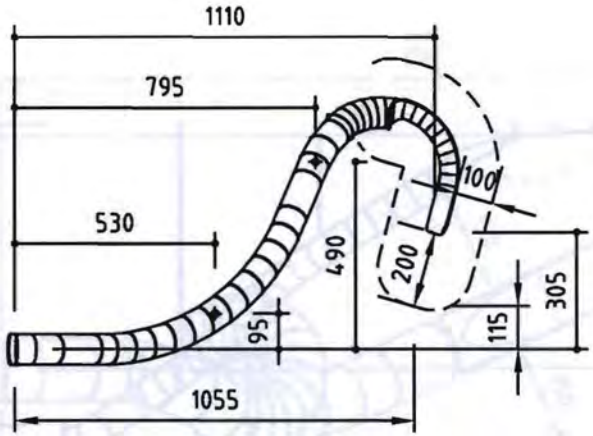
Tunnel Slide • Installation height 784 cm • Right-left curve

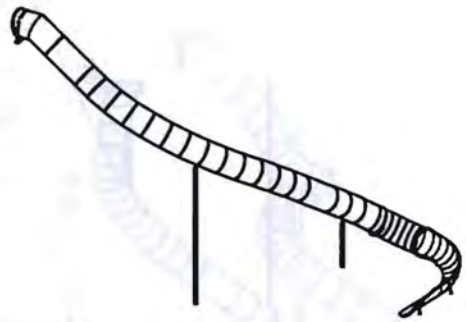
Example 12

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180







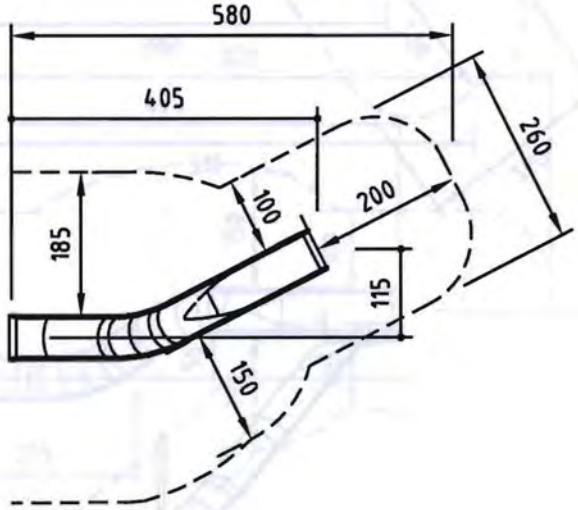


Information on this slide

- installation height 784 cm
- sliding gradient 35-29 °
- sliding length 1881 cm
- three-piece construction
- 2 supports
- weight 860 kg
- suitable for attachment to big pyramid towers (order No. 3.43000)
- snail run-out
- 3 foundations for the run-out 50 x 100 x 40 cm excavation depth 80 cm
- 2 foundations for supports 80 x 80 x 40 cm excavation depth 80 cm

Legend for illustration
safety distance →
dimensions —●
scale 1:200 (format A4)

Tunnel Slide • Installation height 784 cm • Left-right curve **Example 13**



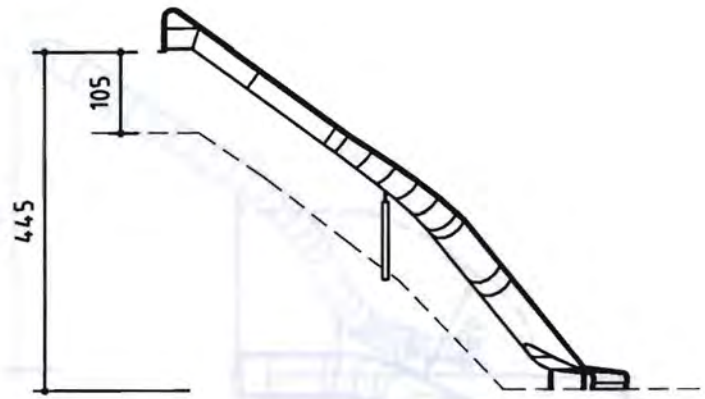
Information on this slide

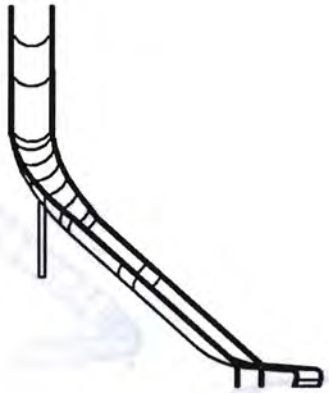
- installation height 200 cm
- sliding gradient 36 °
- **sliding length 478 cm**
- one-piece construction
- weight 135 kg
- standard run-out
- 2 foundations for the run-out
  50 x 70 x 40 cm
  excavation depth 80 cm

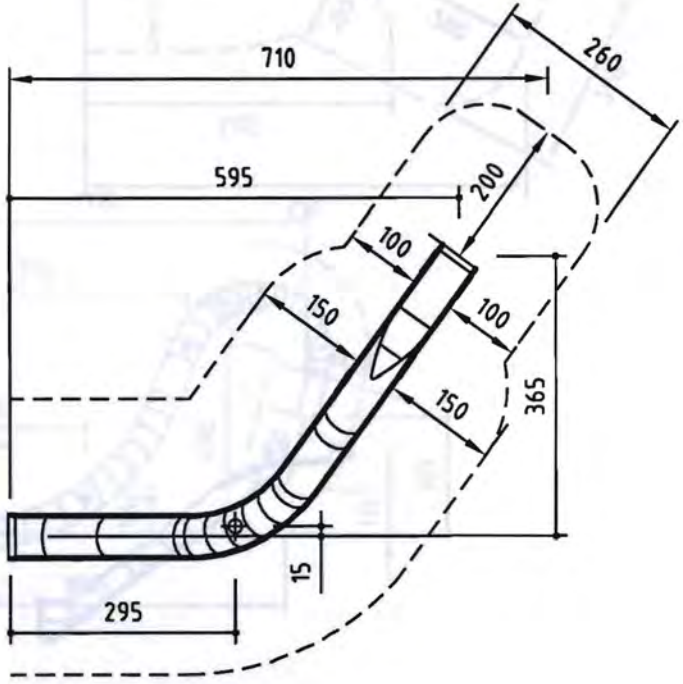
Legend for illustration
safety distance →
dimensions —●
falling space for a fall height of 2.00 m - - - -
scale 1:100 (format A4)

Open Slide • Installation height 200 cm • Left curve

Example 14







Information on this slide

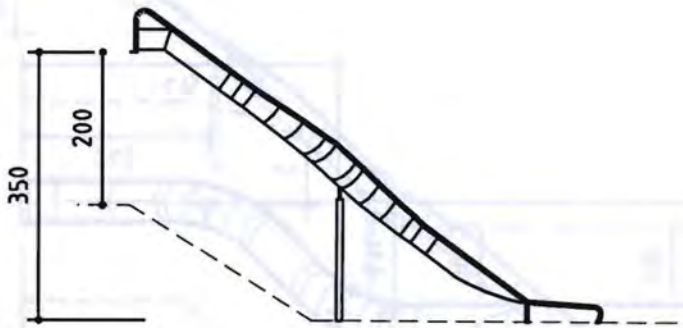
- installation height 445 cm
- sliding gradient 36 °
- sliding length 901 cm
- one-piece construction
- 1 support
- weight 246 kg
- standard run-out
- 3 foundations for the run-out
  50 x 70 x 40 cm
  excavation depth 80 cm
- 1 foundation for support
  80 x 80 x 40 cm
  excavation depth 80 cm

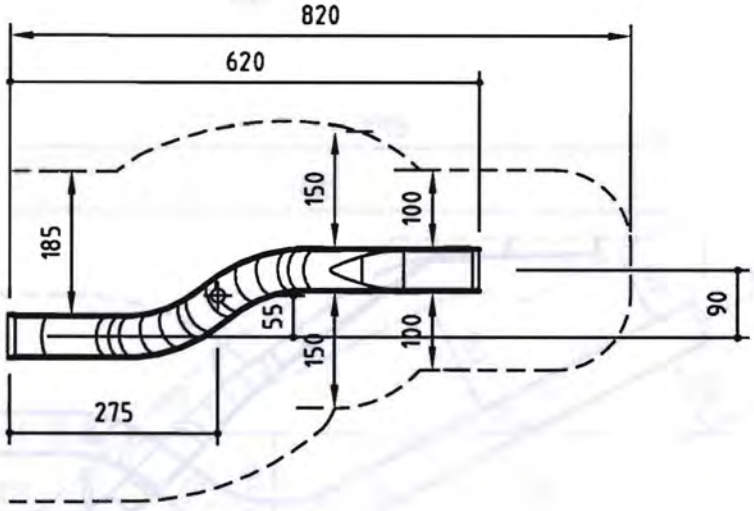
Legend for illustration
safety distance →
dimensions —●
falling space for a fall height of 0.60-1.50 m - - - -
scale 1:100 (format A4)

Open Slide • Installation height 445 cm • Left curve

Example 15

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180





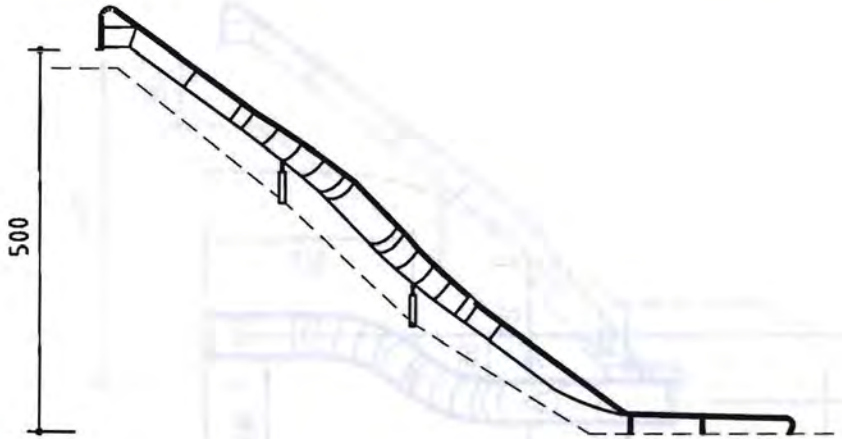
Information on this slide

- installation height 350 cm
- sliding gradient 36 °
- **sliding length 743 cm**
- one-piece construction
- 1 support
- weight 218 kg
- standard run-out
- 2 foundations for the run-out
  50 x 70 x 40 cm
  excavation depth 80 cm
- 1 foundation for support
  80 x 80 x 40 cm
  excavation depth 80 cm

Legend for illustration
safety distance →
dimensions —●
falling space for a fall height of 2.00 m - - - -
scale 1:100 (format A4)

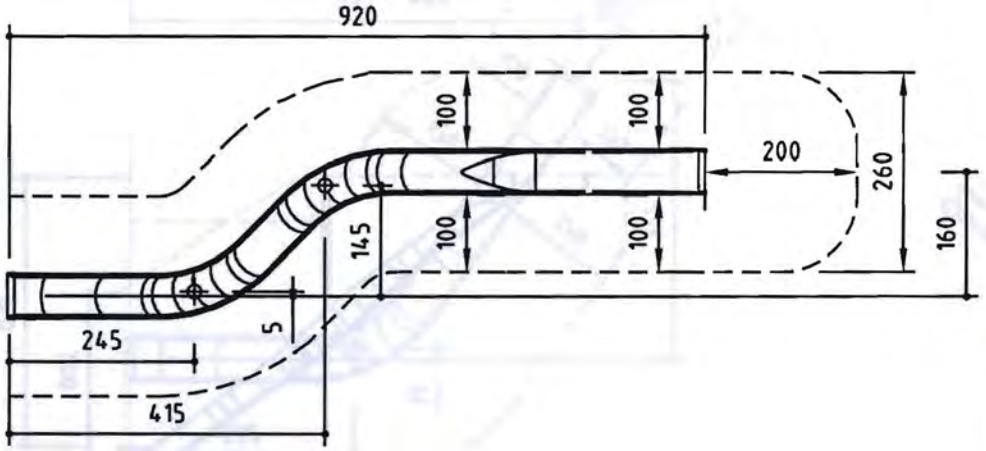
Open Slide • Installation height 350 cm • Left-right curve

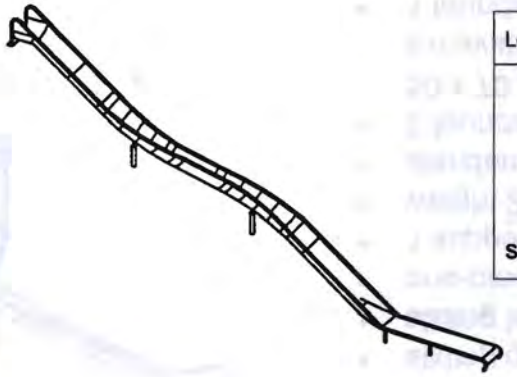
Example 16



Information on this slide

- installation height 500 cm
- sliding gradient 36 °
- sliding length 1130 cm
- one-piece construction
- 2 supports
- weight 298 kg
- extended run-out
- 3 foundations for the run-out
  50 x 70 x 40 cm
  excavation depth 80 cm
- 2 foundations for supports
  80 x 80 x 40 cm
  excavation depth 80 cm





Legend for illustration

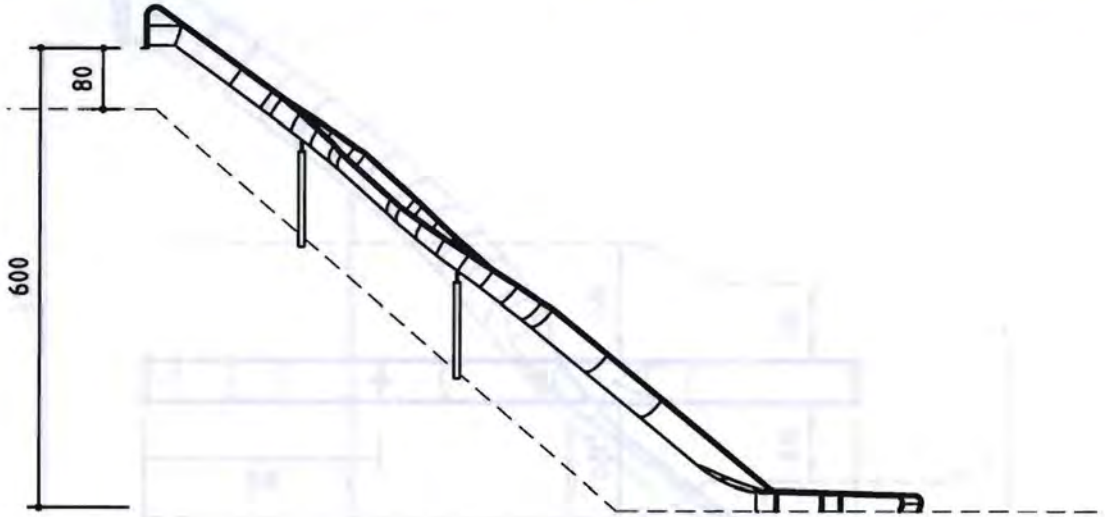
safety distance

dimensions

falling space for a fall height of 0.60 m max.

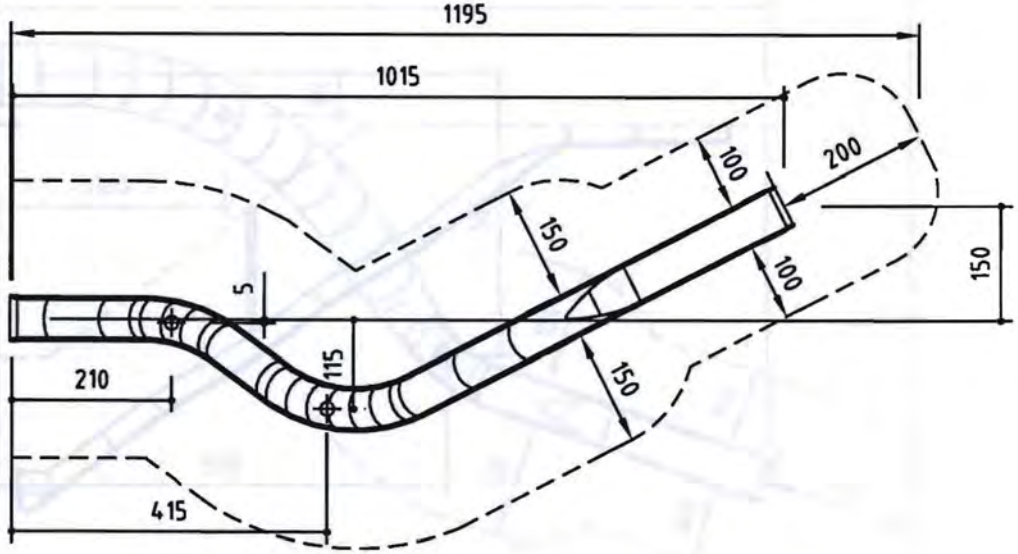
scale 1:100 (format A4)

Open Slide • Installation height 500 cm • Left-right curve **Example 17**



Information on this slide

- installation height 600 cm
- sliding gradient 36 °
- sliding length 1301 cm
- two-piece construction
- 2 supports
- **weight 340 kg**
- extended run-out
- 3 foundations for the run-out
  50 x 70 x 40 cm
  excavation depth 80 cm
- 2 foundations for supports
  80 x 80 x 40 cm
  excavation depth 80 cm



Legend for illustration

safety distance

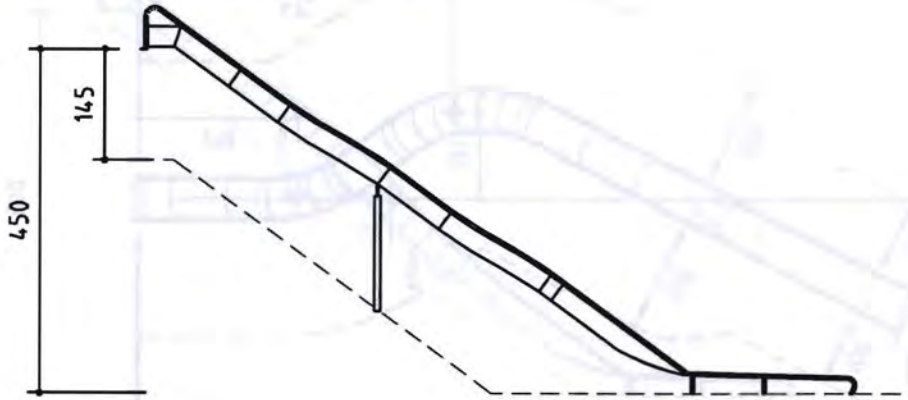
dimensions

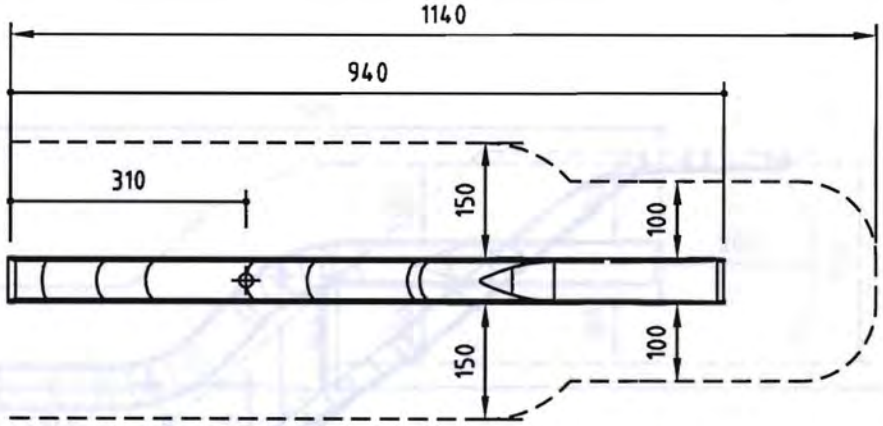
falling space for a fall height of 0.60-1.50m

scale 1:100 (format A4)

Open Slide • Installation height 600 cm • Right-left curve **Example 18**

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180





Information on this slide

- installation height 450 cm
- with 2 waves
- sliding gradient 36 °
- sliding length 1066 cm
- one-piece construction
- 1 support
- weight 276 kg
- extended run-out
- 3 foundations for the run-out
  50 x 70 x 40 cm
  excavation depth 80 cm
- 1 foundation for support
  80 x 80 x 40 cm
  excavation depth 80 cm

Legend for illustration

safety distance

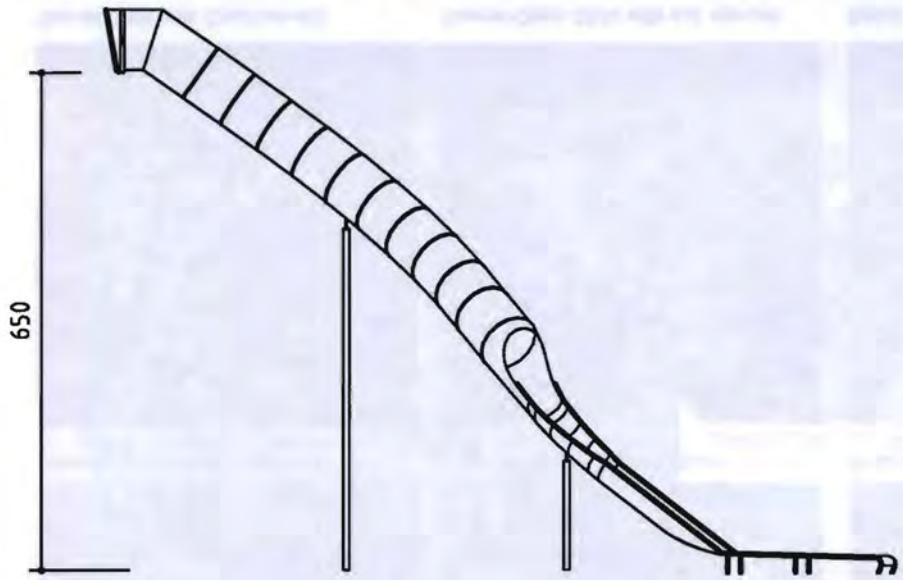
dimensions

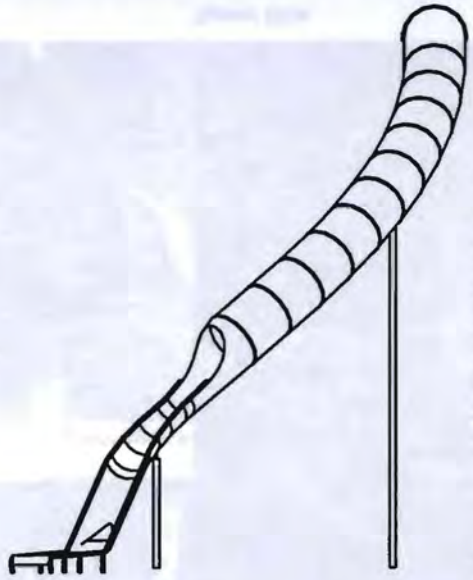
falling space for a fall
height of 0.60-1.50m

scale 1:100 (format A4)

Open Slides with Waves • Installation height 450 cm • Straight **Example 19**

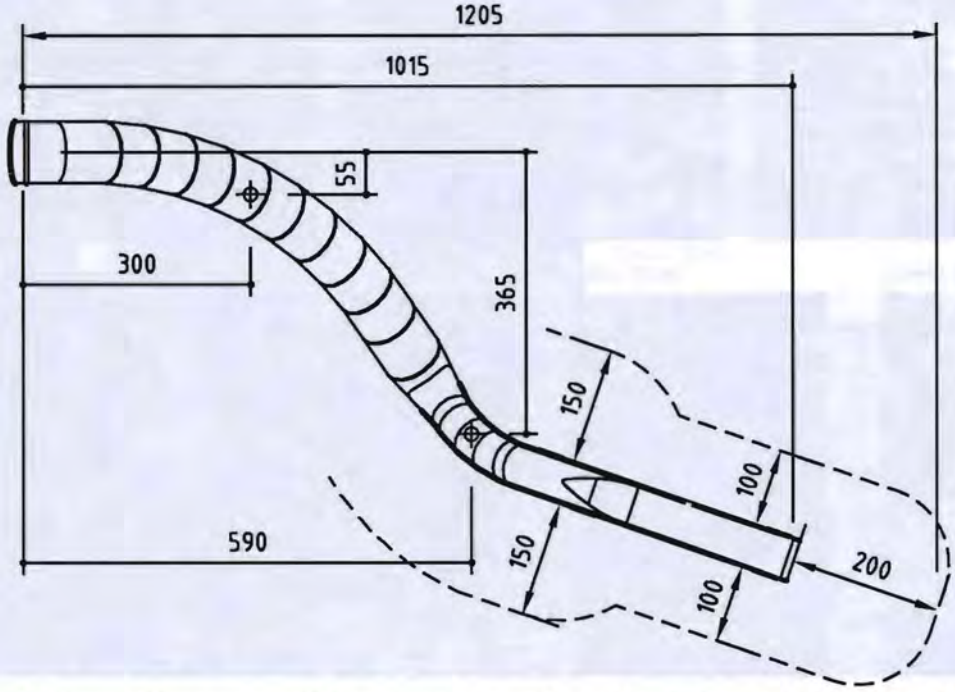
RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180





Information on this slide

- installation height 650 cm
- sliding gradient 35-36 °
- sliding length 1407 cm
- two-piece construction
- 2 support
- weight 565 kg
- extended run-out
- 3 foundations for the run-out
  50 x 70 x 40 cm
  excavation depth 80 cm
- 2 foundations for supports
  80 x 80 x 40 cm
  excavation depth 80 cm



Legend for illustration

safety distance →

dimensions —●

falling space for a fall - - - - height of 0.60-1.50 m

scale 1:100 (format A4)

Combined Tunnel/Open Slide • Installation height 650 cm • Right-left curve Example 20

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180

Open and Tunnel Slides

Open Slide

Tunnel Slide with Spiral

Tunnel Slide

Open and Tunnel Slides

Open Slide with Slide Support

Snail run-out

Tunnel Slide with Snail run-out

Tunnel-Open-Slide with ext. run-out

Spiral

Photographs

Open Slide

Tunnel Slide for Pyramid Tower Special

Open-Slide with extended run-out

Tunnel Slide

Tunnel Slide

Open Slide

Tunnel Slides

Open Slides

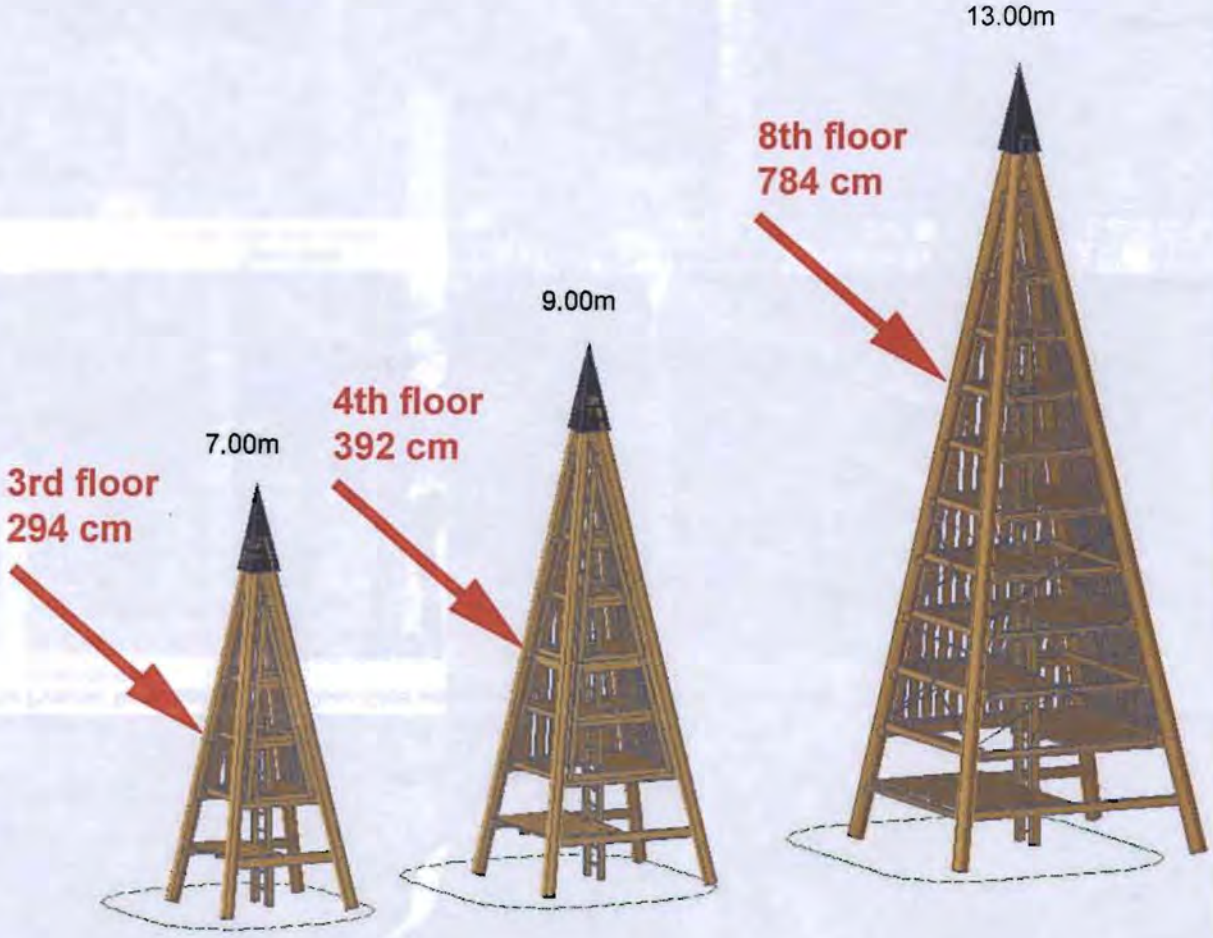
Tunnel Slide

Snail run-out

Photographs

Maximum installation heights for slides

- There are 3 different pyramid towers: small (total height 7.00m), middle (9.00m) and large (13.00m).
- Pyramid towers have half-floors that are located alternating on the left and then right hand side at distances of 98 cm one above the other.
- With the two larger pyramid towers no slide can be fitted to the uppermost floor due to a shortage of space.
- The small pyramid tower has a total of 3 floors. It is possible to attach a slide to the 3rd floor: 294 cm.
- The medium sized pyramid tower has 5 floors. Attachment to max. the 4th floor: 392 cm.
- The big pyramid tower has 9 floors. Attachment to max. 8th floor: 784 cm.

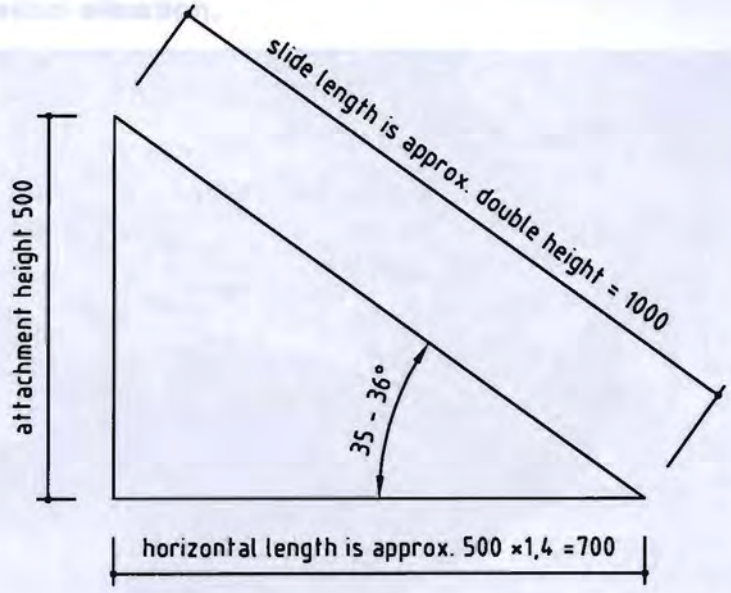


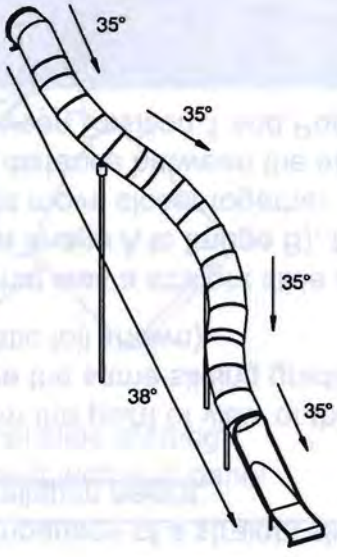
Information of interest on pyramid towers

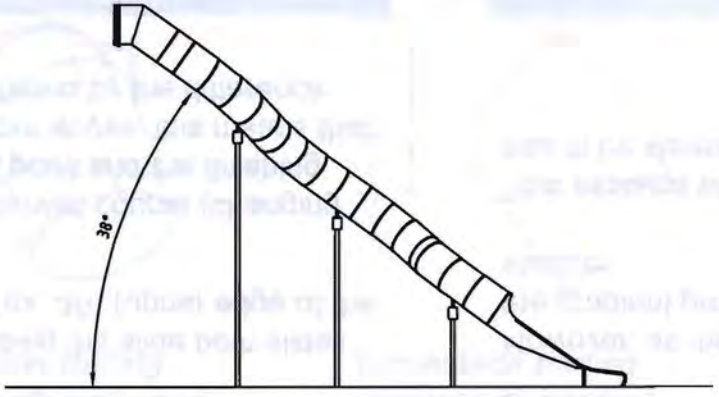
Our slides have, as a rule, a gradient of 35 - 36 °. (For slides with a very high installation height the gradient can be reduced to up to 30°).

For <u>straight slides</u> this results in the rule of thumb:
sliding length is approximately twice the installation height
horizontal length is approx. installation height x 1.4
sliding gradient = total gradient
See illustration to the right.

For <u>slides with curves</u> in spite of the sliding gradient staying the same, the total gradient angle increases.
See illustration below.







Information of interest on the sliding gradient

Comparison of a straight slide to a curved slide with the same installation height:

From the point of view of the person using the slide both slides have the same sliding gradient of approx. 36° (upper edge of the plastic foil shown).

If what was a straight slide is given a curved course (changing from Image A to Image B), the starting point and the finishing point move closer together. Looking from above, this means that the distance between the ends is shortened by the difference between Position 1 and Position 2.

However, as the installation height has remained the same the gradient projected onto the side view necessarily becomes steeper.

This explains why a hill on which a curved slide is to be installed has to be steeper than if the slide were straight.

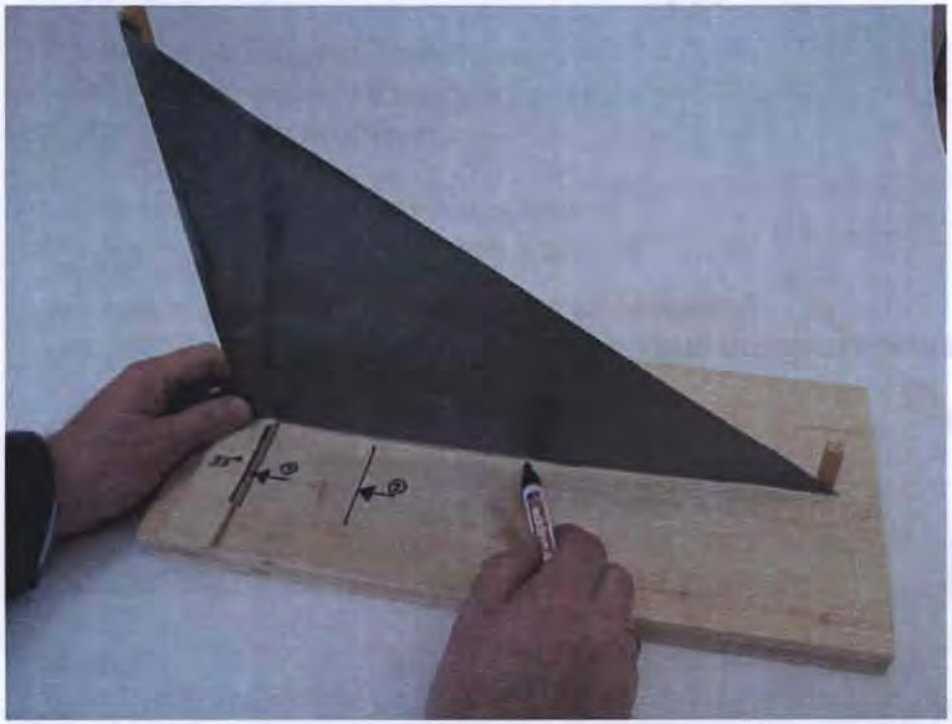


Image A

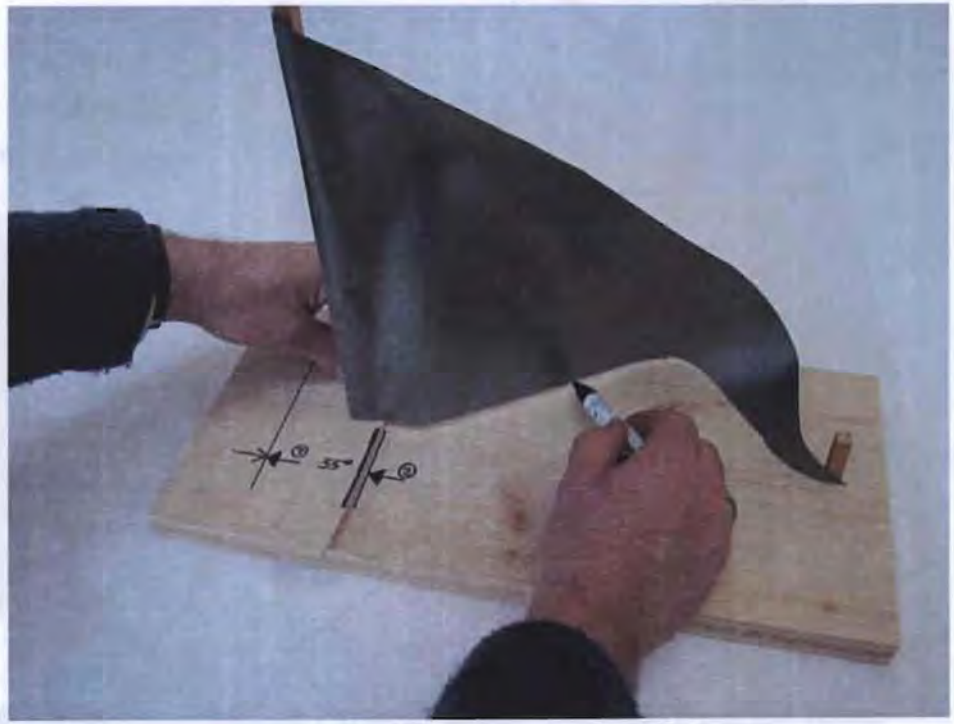
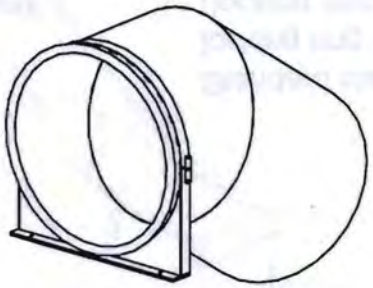


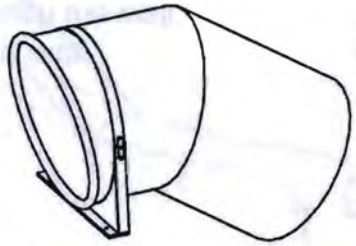
Image B

Information of interest on the sliding length

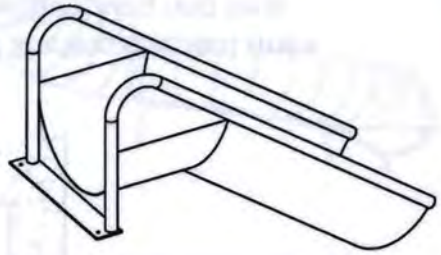
There are 6 different starting elements which are used depending on the installation situation.



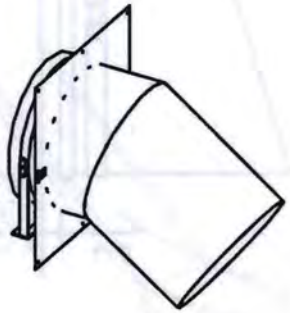
Tunnel slide starting element with locking ring



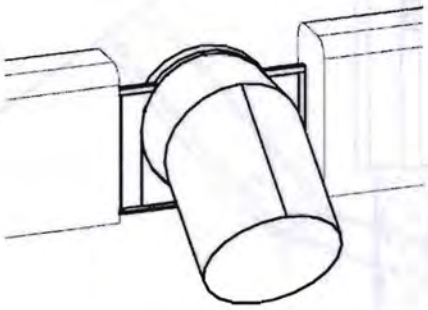
Pyramid tower starting element for tunnel slides



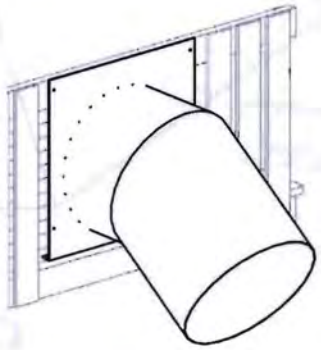
Open slide starting element



Tunnel slide starting element with wall panel



Tunnel slide starting element with wall panel for balustrade walls



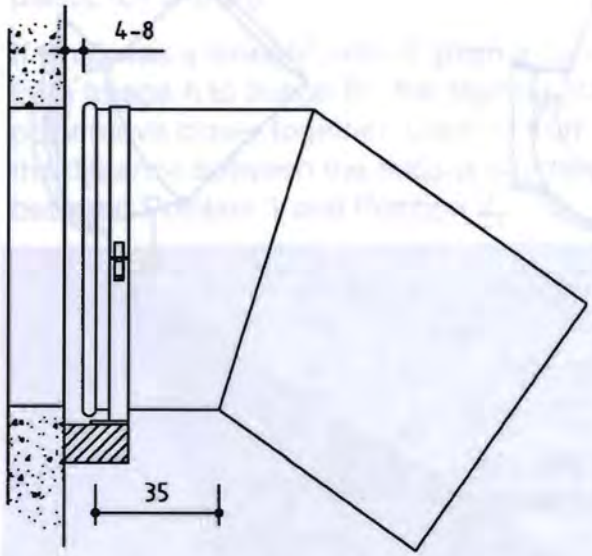
Tunnel slide starting element with handrail panel

The connections for the slides around the starting element area have to be such that they can pass the test procedures for play equipment. In particular the test procedures for head and neck entrapment as well as the toggle test need to be observed.

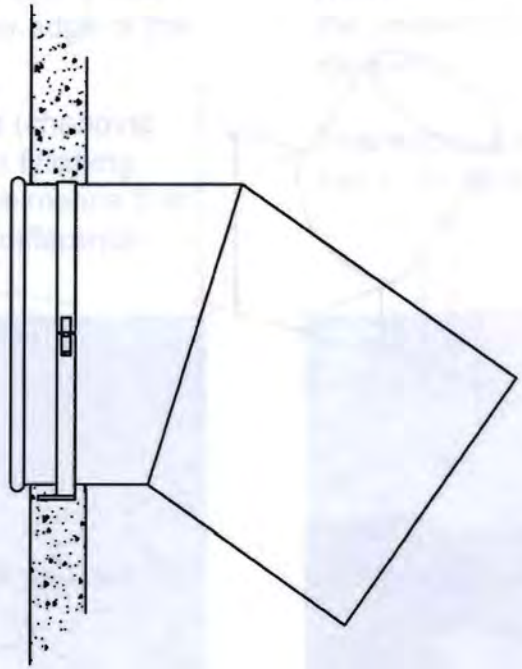
Information of interest on starting elements

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON +49-8052/17980·FAX 4180

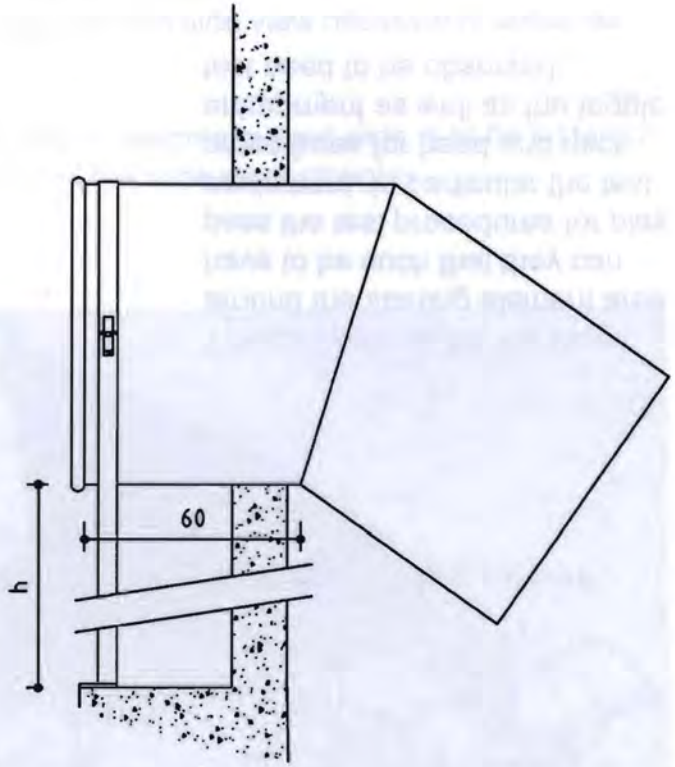
Escape slides (usually tunnel slides), as a rule, must be attached to building walls. See installation examples below:



Standard starting element with locking ring installed on support prepared on site. Distance to the wall approx. 4 - 8 cm.



Standard starting element with locking ring installed through the wall (locking ring set into concrete), wall panel available on request.

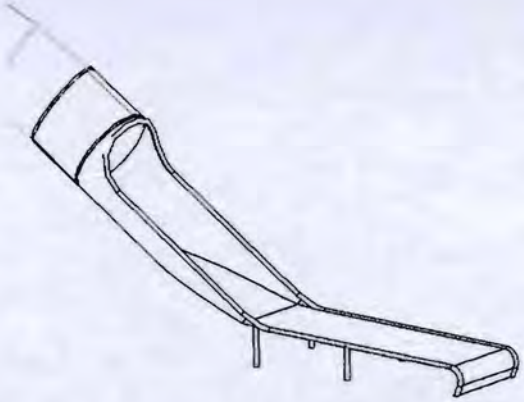


Extended starting element (max. 100 cm) with locking ring (e.g., for thick walls above heaters) and extended supports (custom-built), wall panel available on request.

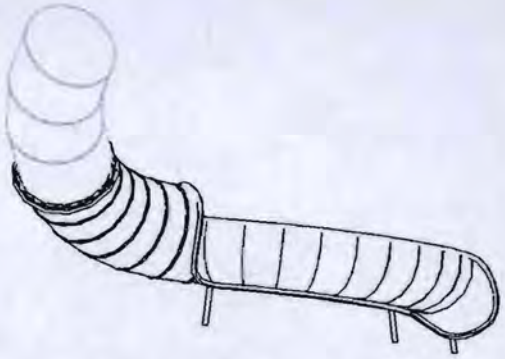
Information of interest on escape slides

RICHTER SPIELGERÄTE GMBH·D-83112 FRASDORF·TELEFON + 49-8052/17980·FAX 4180

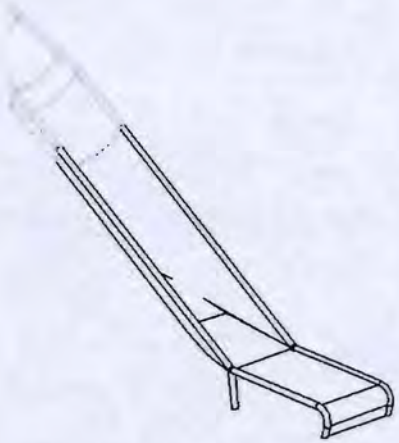
Standard run-out for tunnel slides with normal sliding speed (e.g., due to low installation height, descent slowed down by curves)



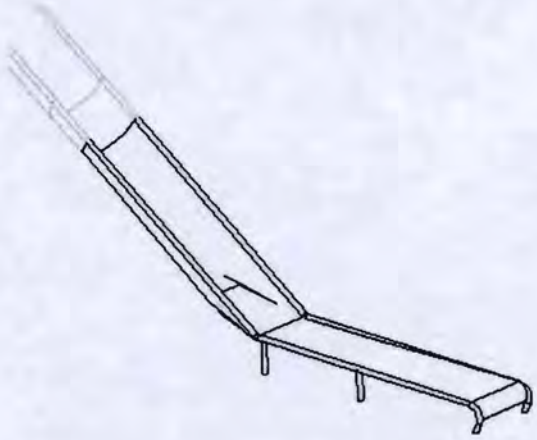
Extended run-out for tunnel slides with high sliding speed (e.g., due to high installation height, long straight courses)



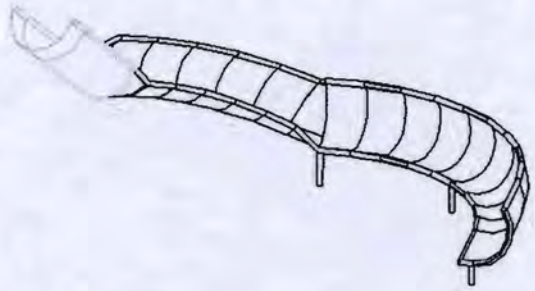
Snail run-out for tunnel slides with high sliding speed (e.g., due to high installation height, long straight courses)



Standard run-out for open slides



Extended run-out for open slides



Snail run-out for open slides

Information of interest on run-out types